

ABSTRACT:

The present invention discloses an improved adaptive line enhancer comprising an adaptive Gray-Markel lattice notch filter having an adaptive notch frequency, in which the notch frequency is determined according to a notch frequency variable k , characterized in that the value of k for the $n+1^{\text{th}}$ sample period is determined according to the following equation:

$$k(n+1) = k(n) - \text{sgn}[y(n)]\text{sgn}[UPDATEFN] \times \mu$$

in which $y(n)$ is the notch filter output, μ is the adaptation constant, and $UPDATEFN$ has a transfer function in the z -transform domain of:

$$\frac{(\alpha - 1)(k(n) - 1)z^{-1}}{1 + k(n)(1 + \alpha)z^{-1} + \alpha z^{-2}}$$

in which α determines the bandwidth and $k(n)$ is a variable for determining the current notch frequency.

A corresponding method is also disclosed.

The algorithm for adapting the notch frequency enables the notch frequency to be directly calculated from knowledge of internal variables of the wave digital filter.